Supplementary materials

Multitarget action of xanthones from *Garcinia mangostana* against α-amylase, α-glucosidase and pancreatic lipase

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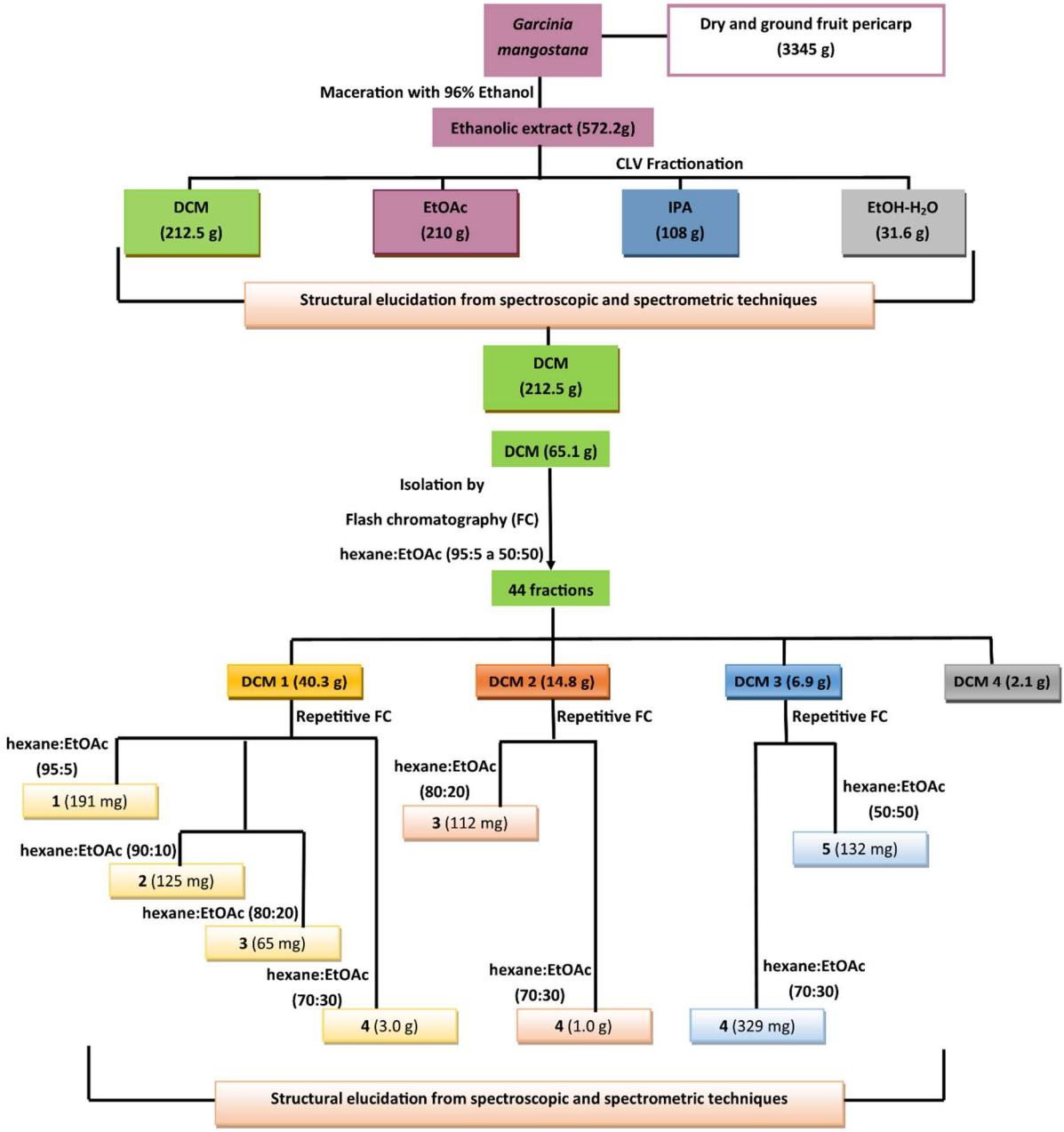
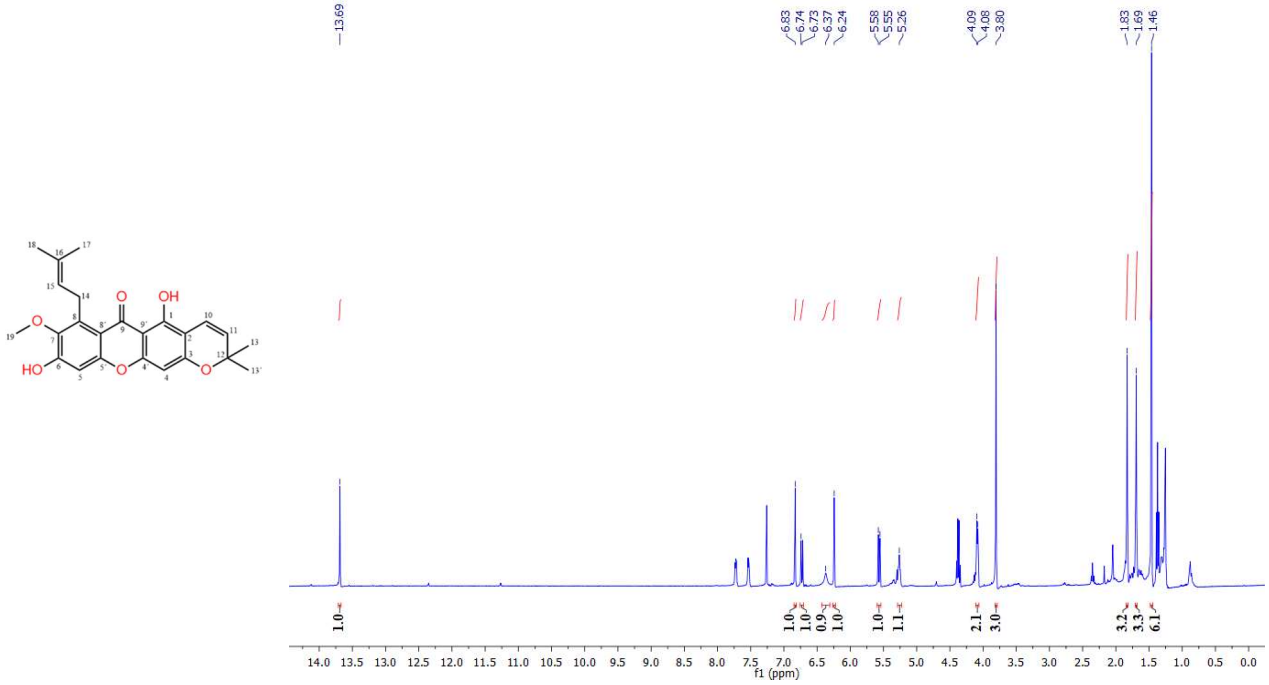
1. Isolation Compound.

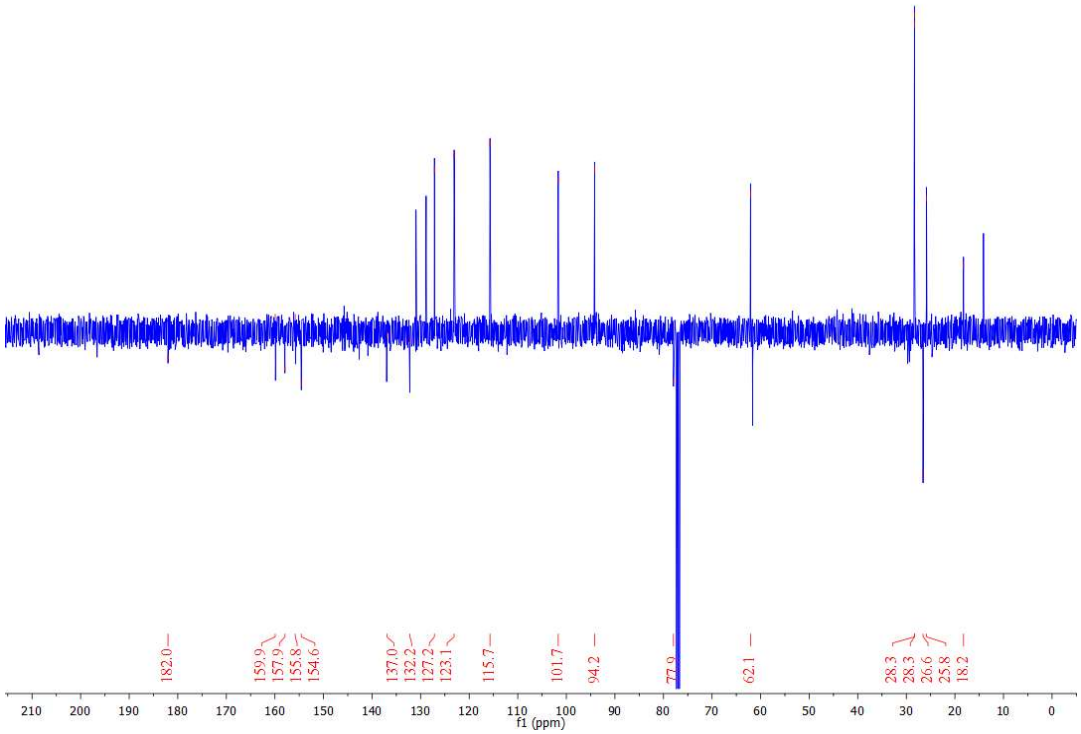


Scheme S1. Isolation scheme of compounds **1** to **5** from *G. mangostana.*

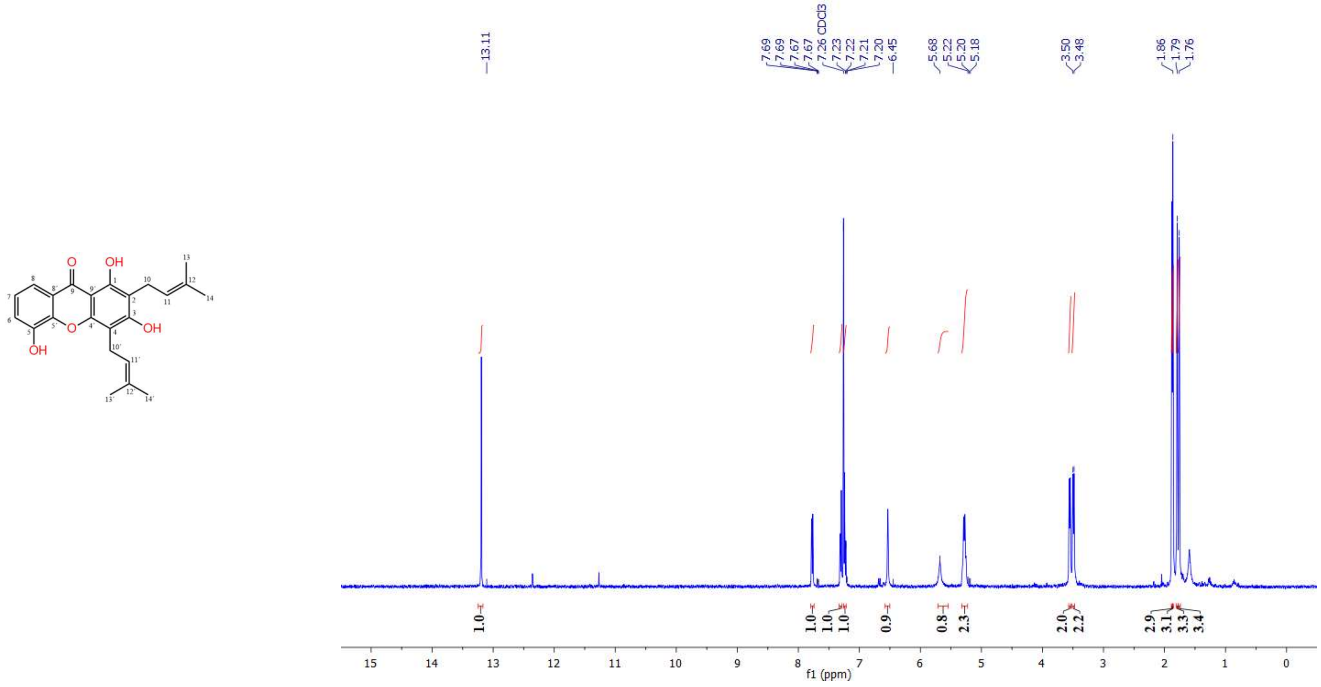
2. NMR spectra from phytochemistry isolation and synthetics compounds.



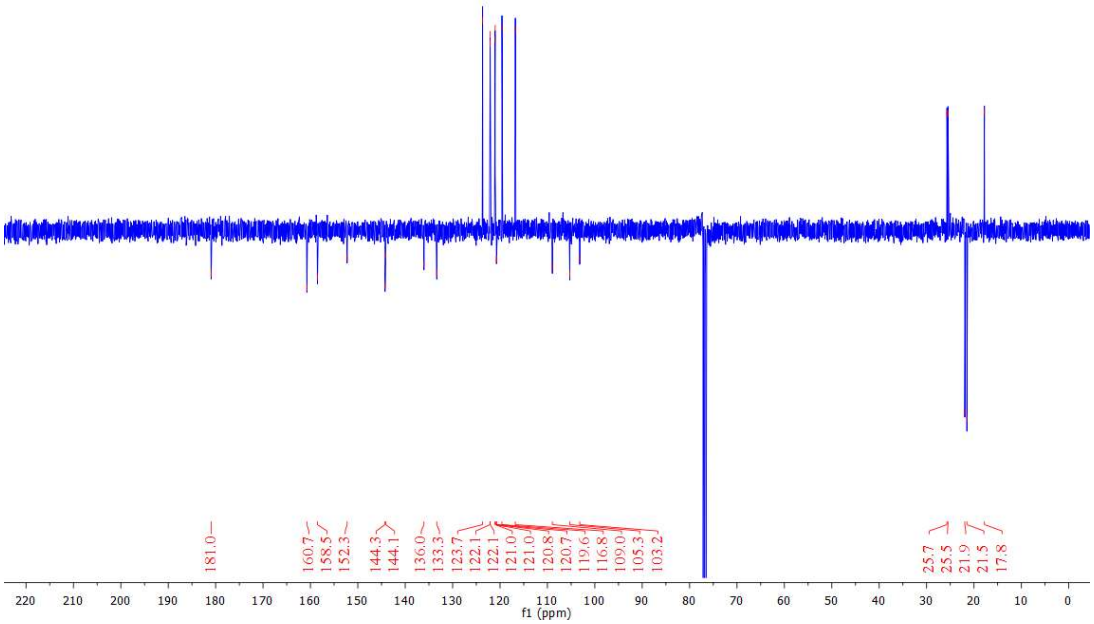
Figures S1. ^{1}H -NMR spectra of 9-hydroxycalabaxanthone (**1**).



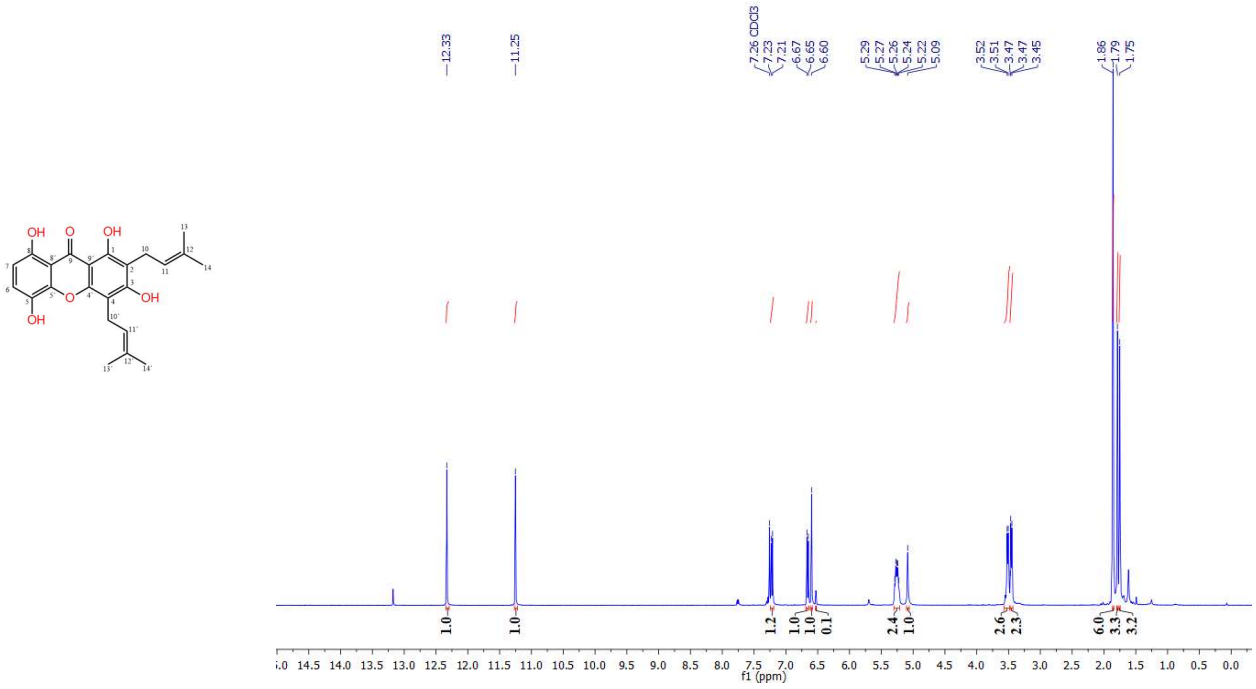
Figures S2. APT spectra of 9-hydroxycalabaxanthone (**1**).



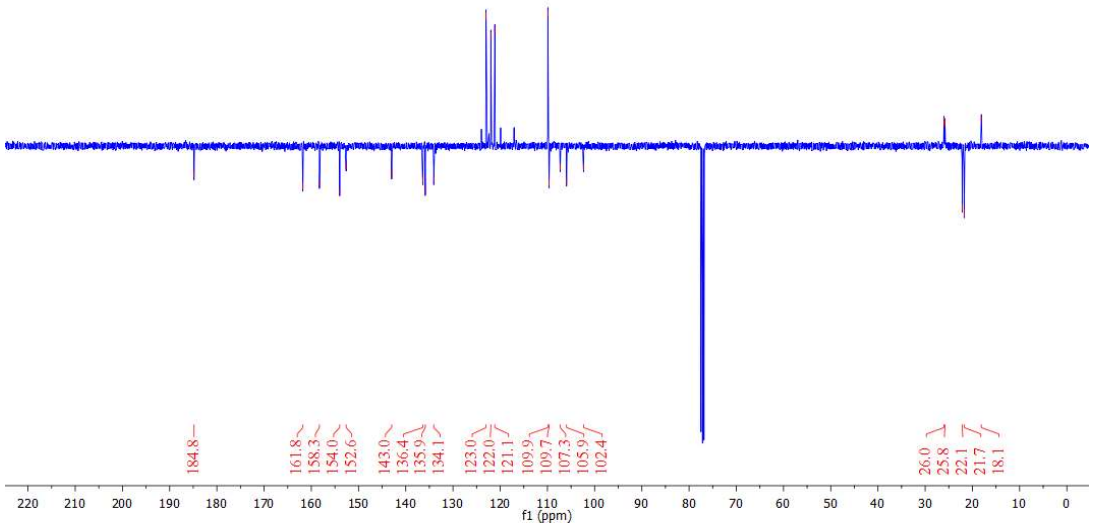
Figures S3. ^{1}H -NMR spectra of 8-deoxygartanin (**2**).



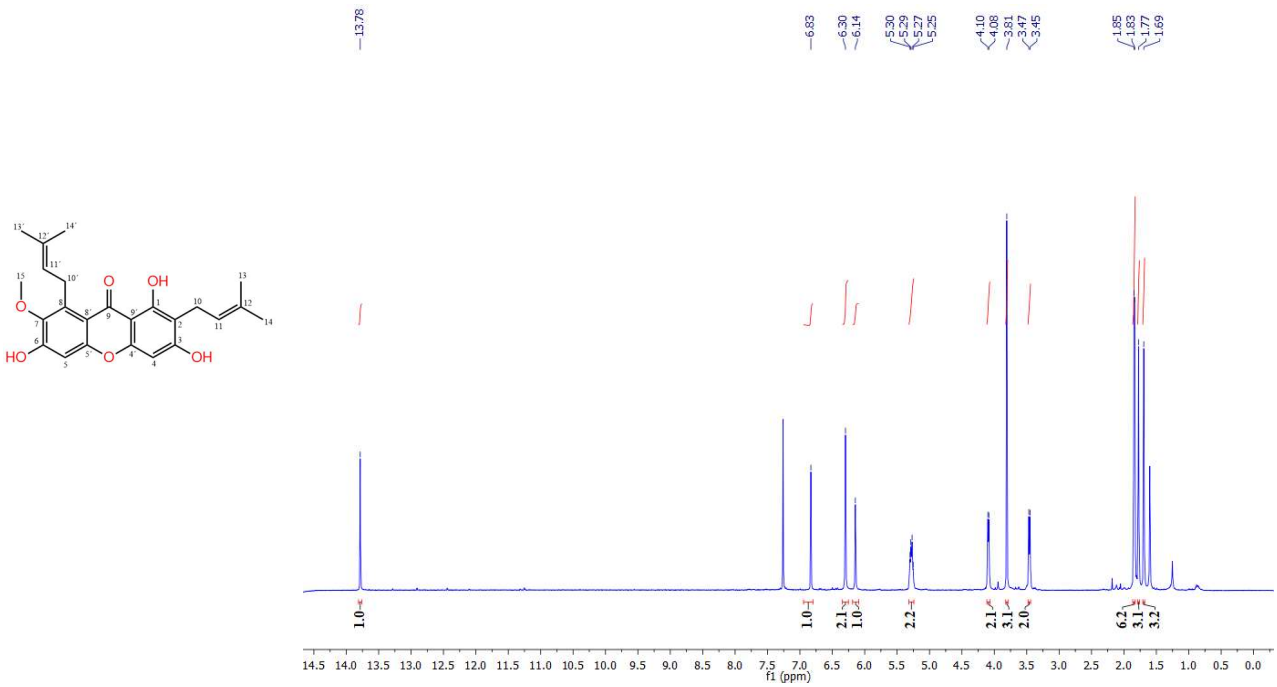
Figures S4. APT spectra of 8-deoxygartanin (**2**).



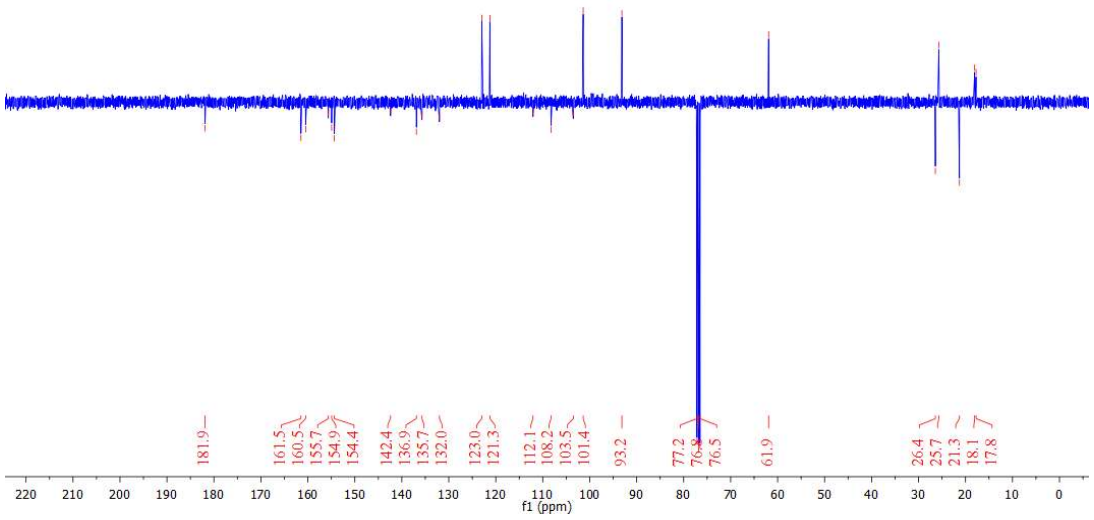
Figures S5. ^{1}H -NMR spectra of gartanin (**3**).



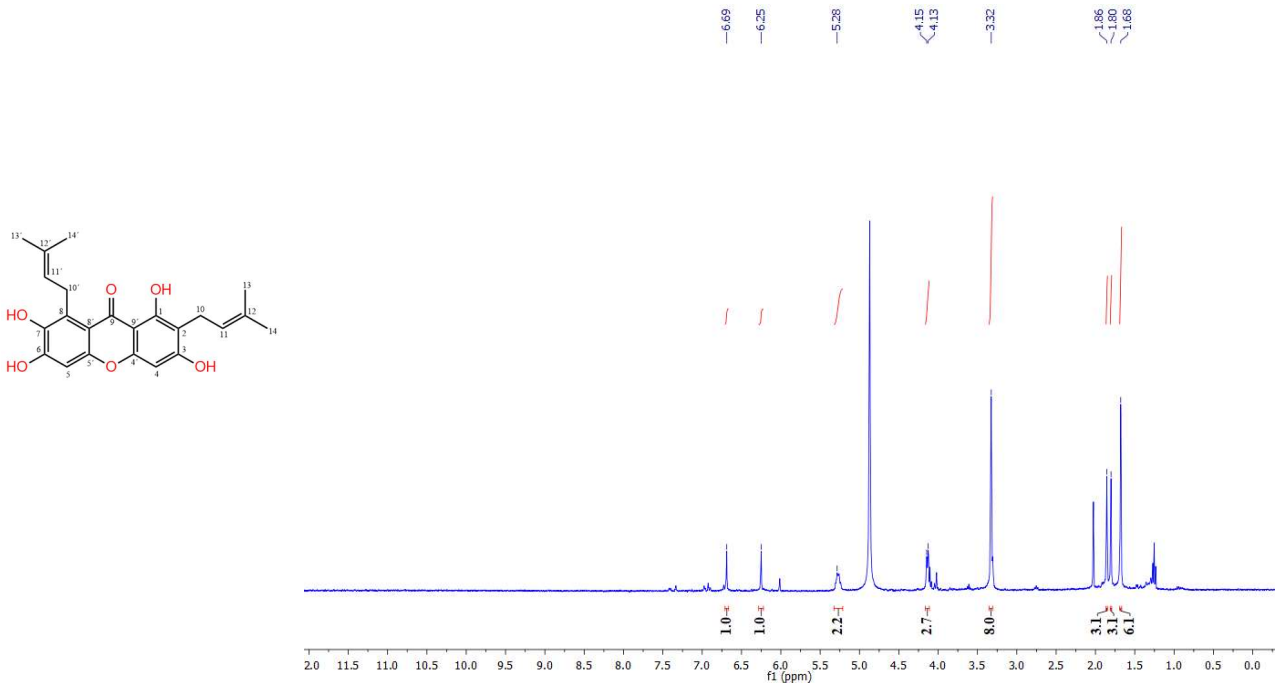
Figures S6. APT spectra of gartanin (**3**).



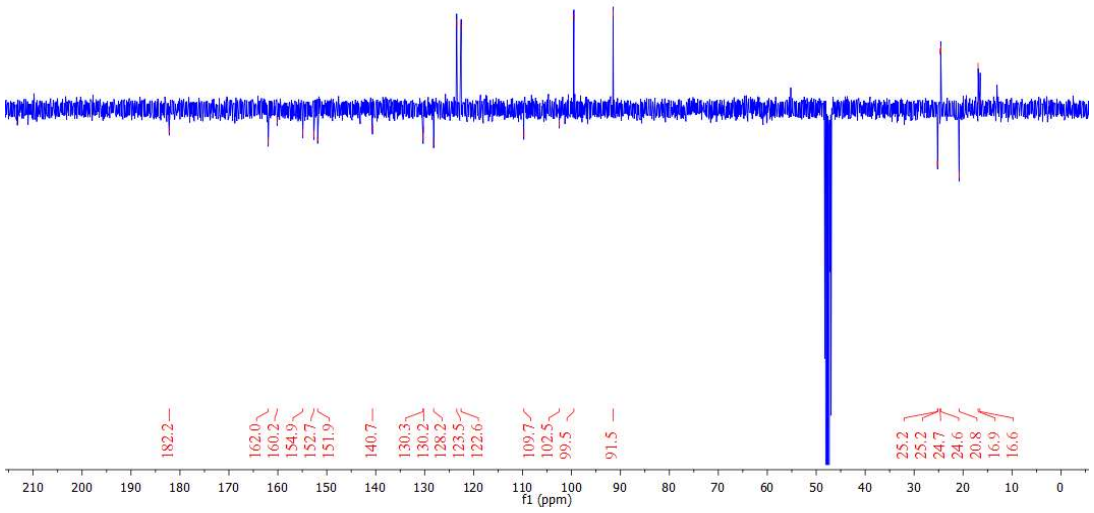
Figures S7. ^{1}H -NMR spectra of α-mangostin (**4**).



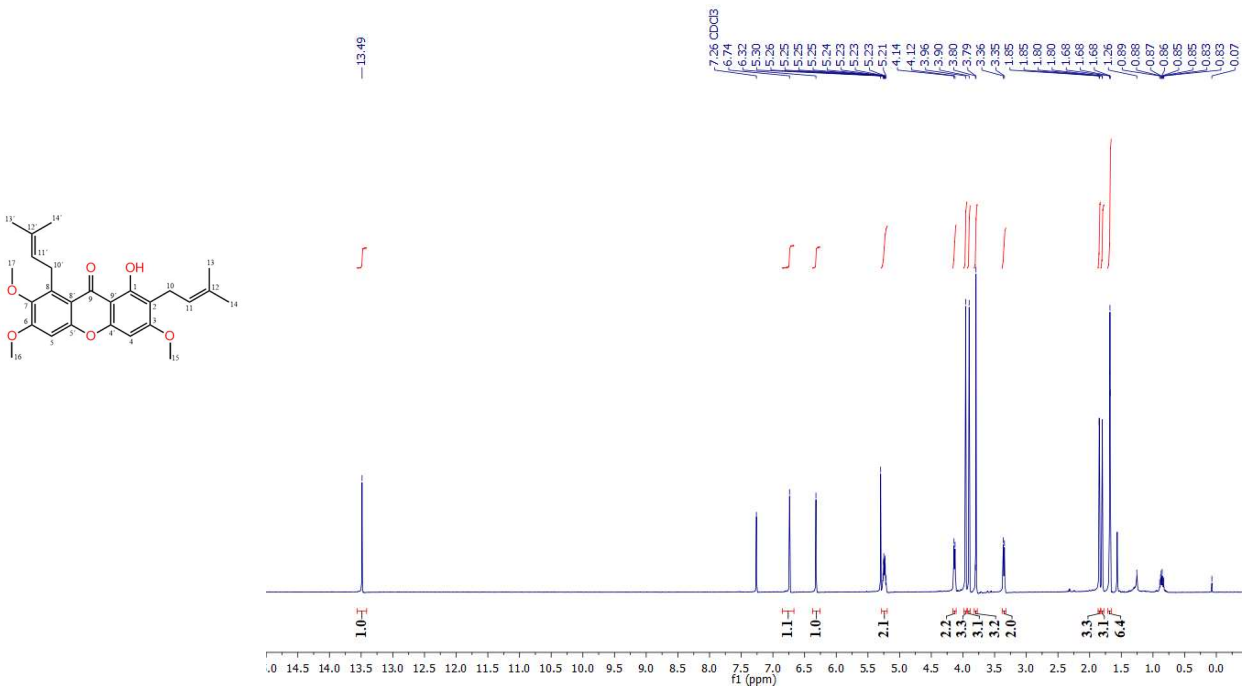
Figures S8. APT spectra of α-mangostin (**4**).



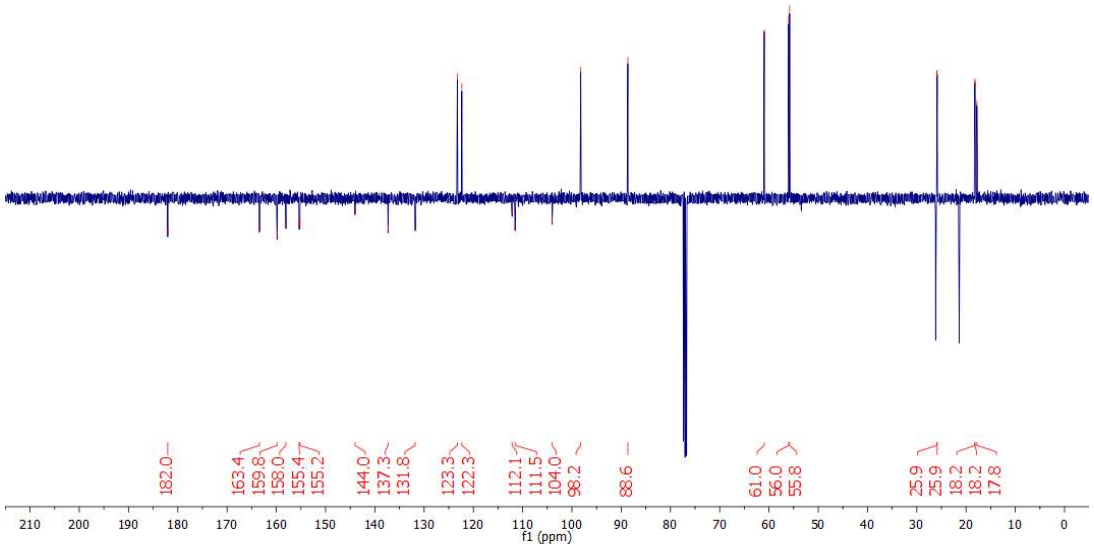
Figures S9. ^{1}H -NMR spectra of γ-mangostin (**5**).



Figures S10. APT spectra of γ-mangostin (**5**).



Figures S11. ^{1}H -NMR spectra of fuscaxanthone C (**6**).



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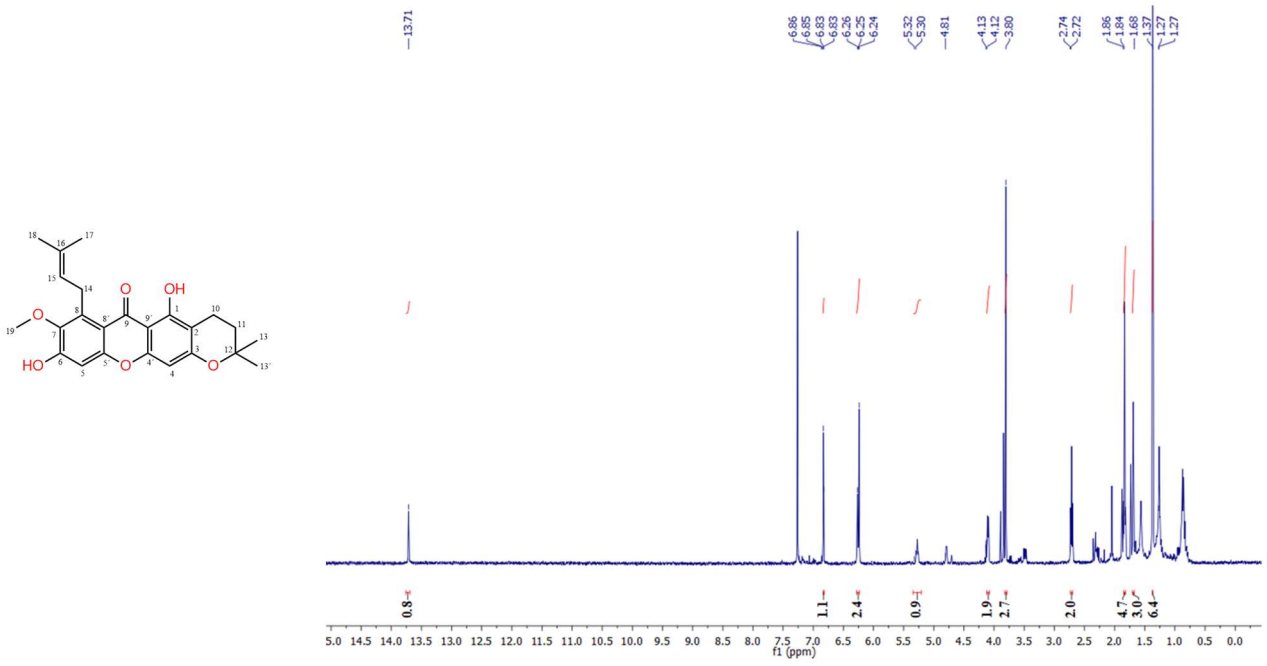
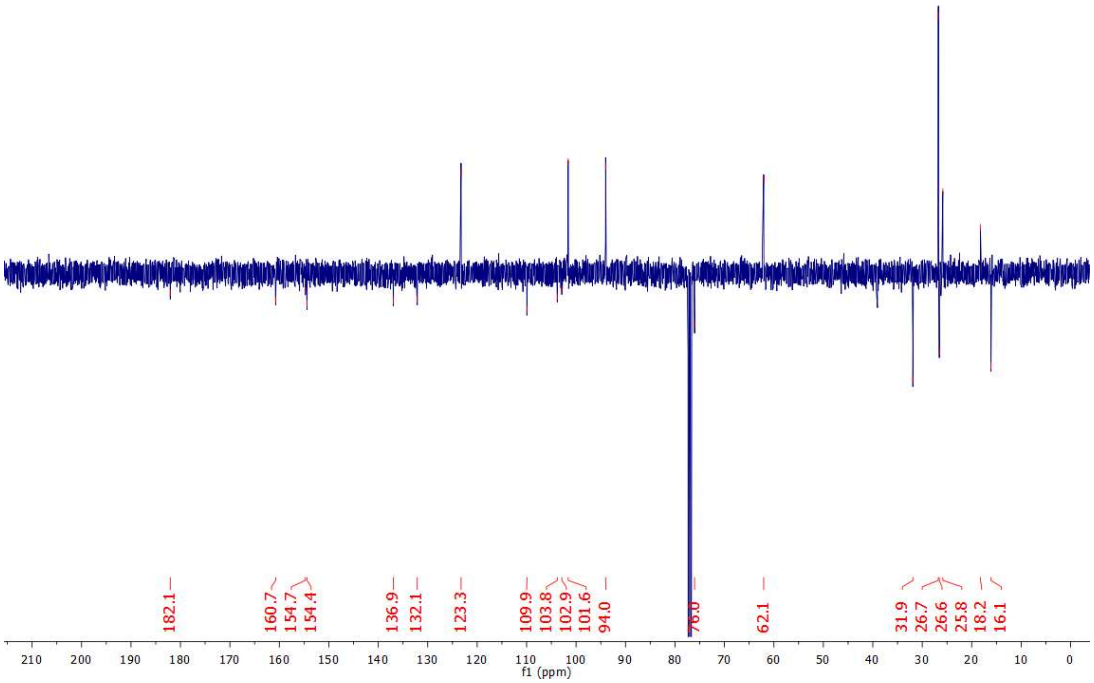
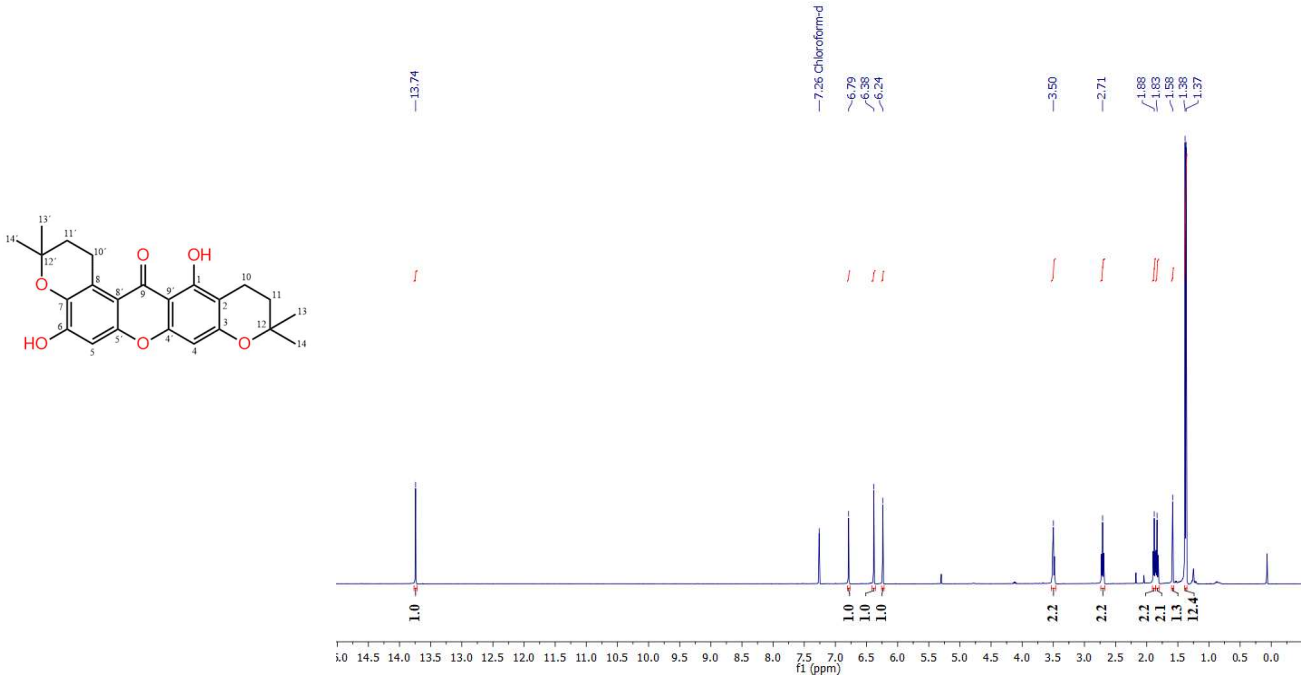


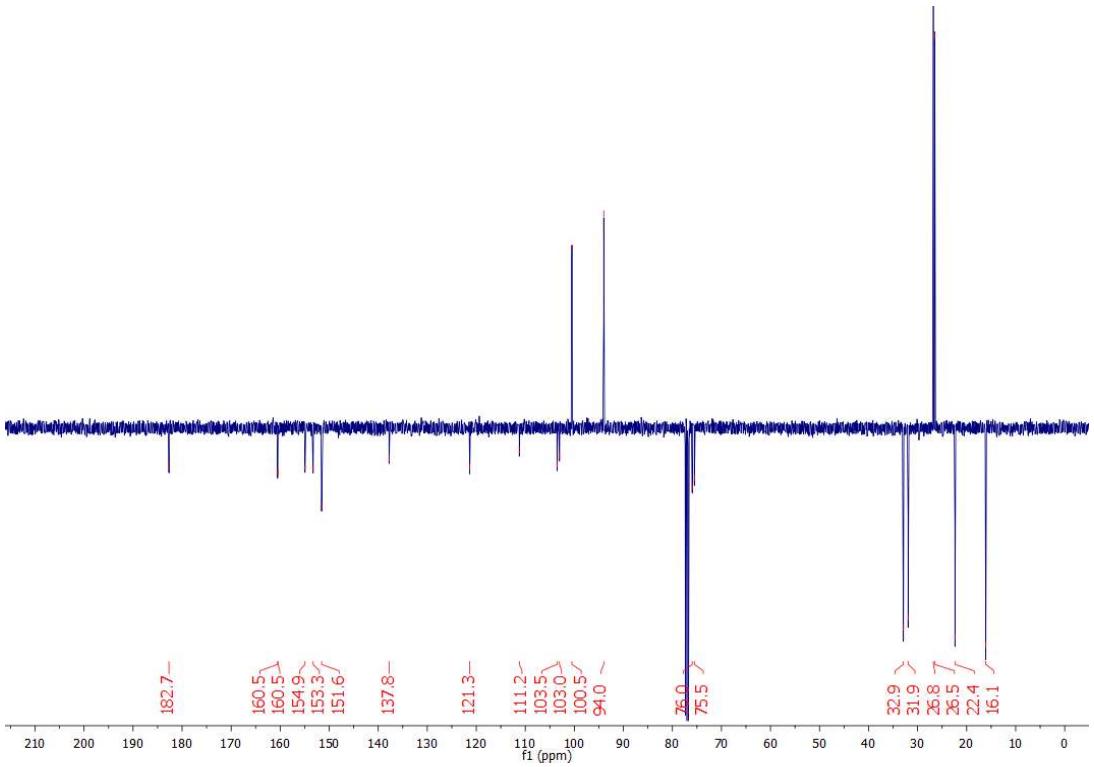
Figures S13. ^{1}H -NMR spectra of 3-isomangostin (**7**).



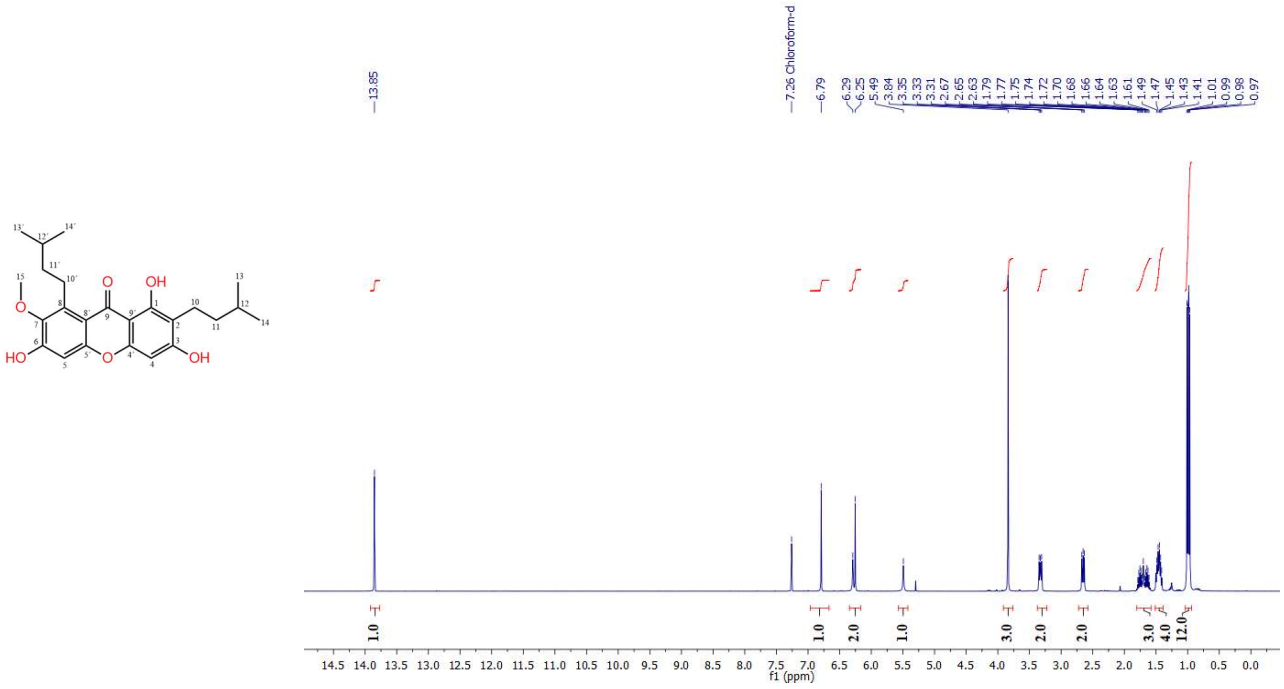
Figures S14. APT spectra of 3-isomangostin (**7**).



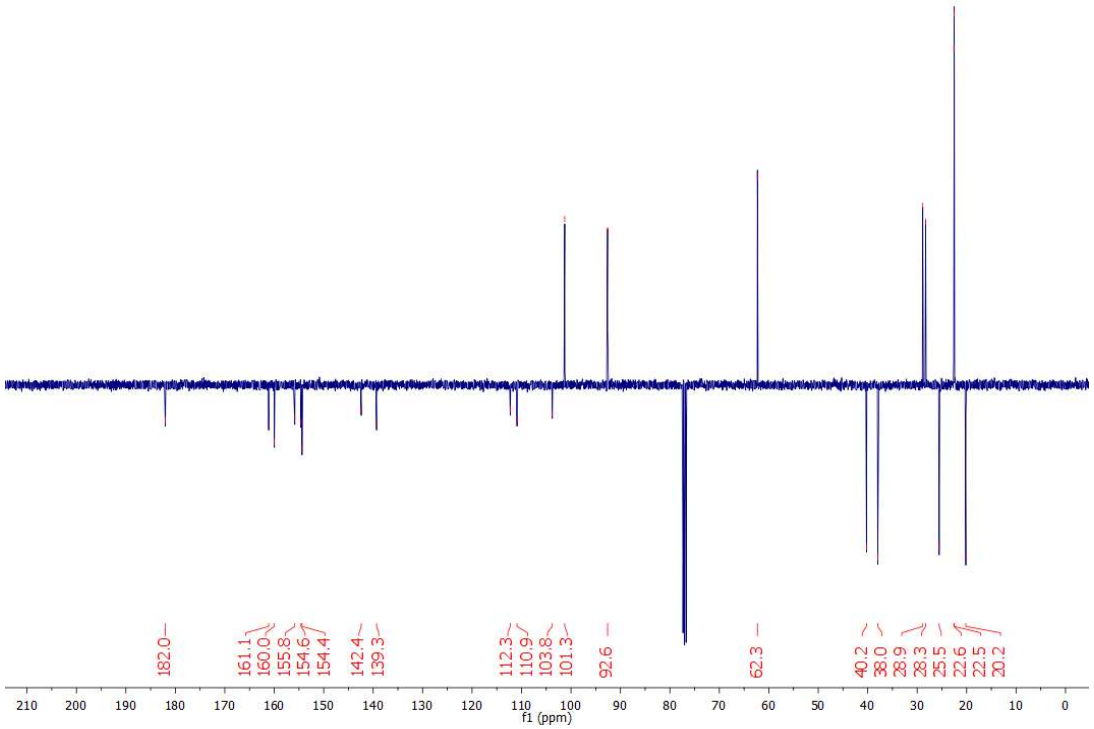
Figures S15. ^{1}H -NMR spectra of BR-xanthone-A (**8**).



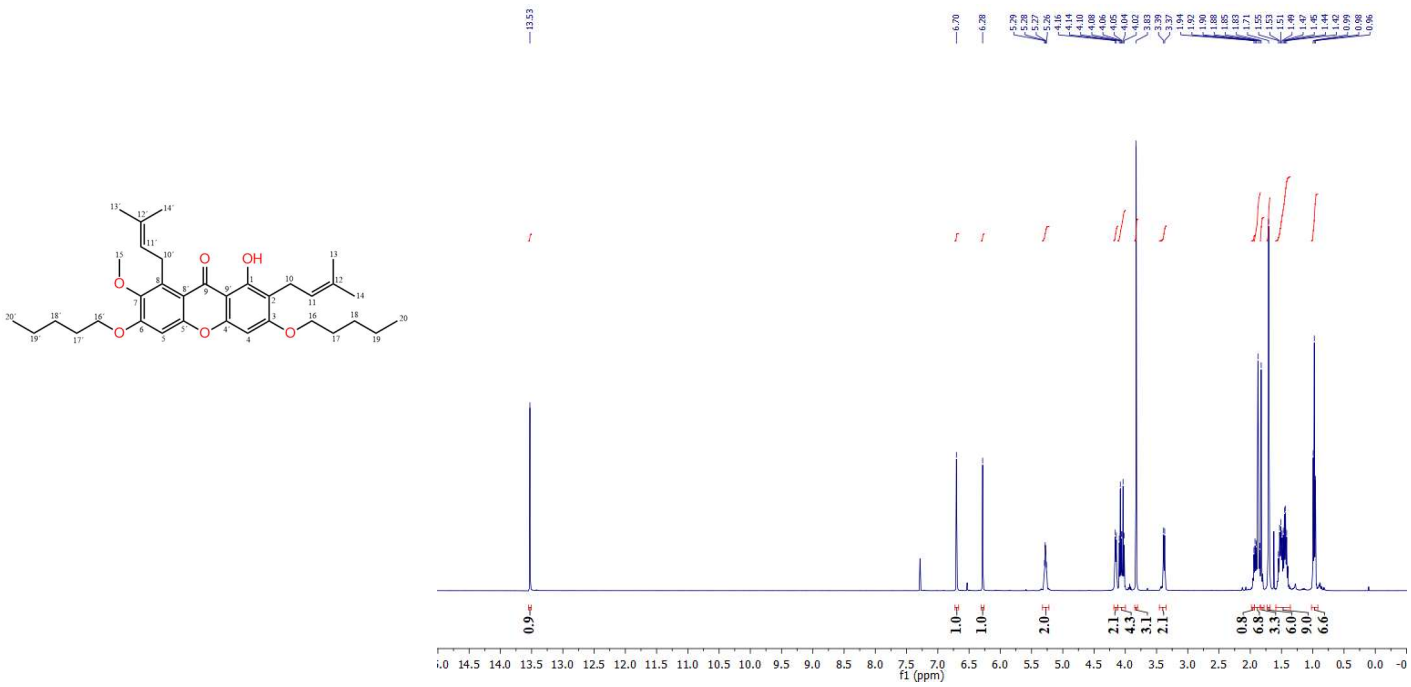
Figures S16. APT spectra of BR-xanthone-A (**8**).



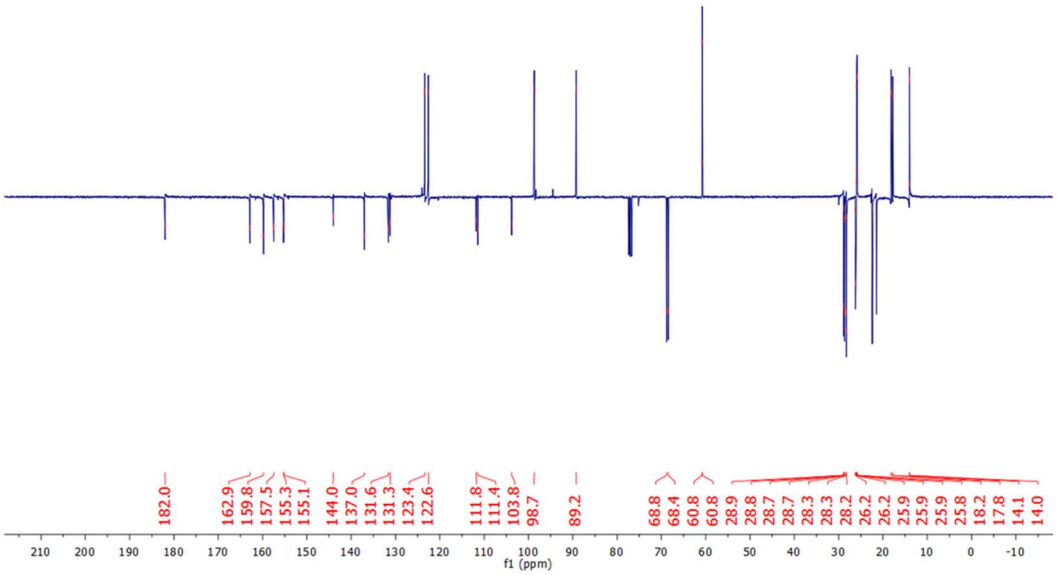
Figures S17. ^{1}H -NMR spectra of tetrahydro-α-mangostin (**9**).



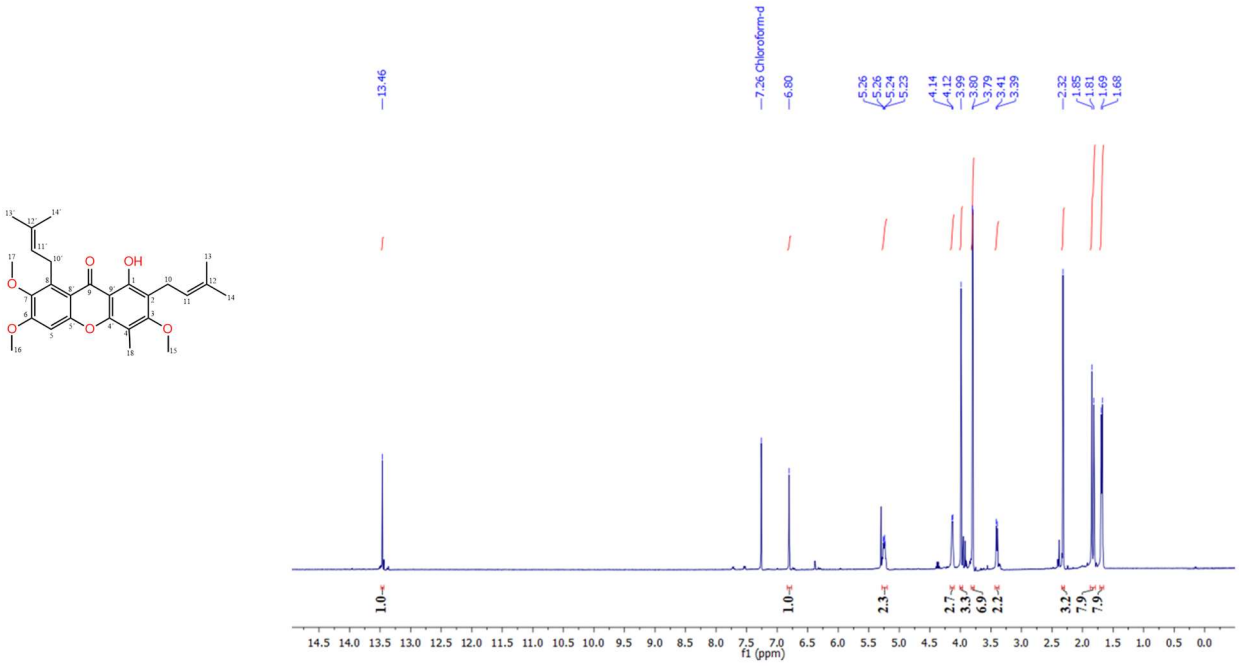
Figures S18. APT spectra of tetrahydro-α-mangostin (**9**).



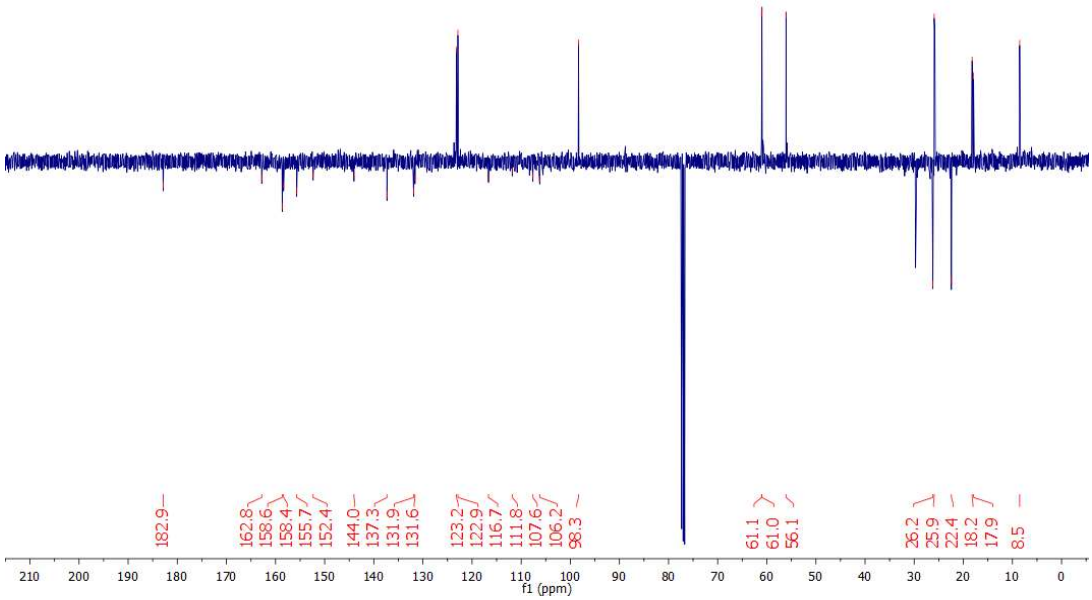
Figures S19. ^{1}H -NMR spectra of 3,6-di-pentoxy-α-mangostin (**10**).



Figures S20. APT spectra of 3,6-di-pentoxy-α-mangostin (**10**).



Figures S21. ^{1}H -NMR spectra of 3,6-di-methoxy-4-methyl-α-mangostin (**11**).



Figures S22. APT spectra of 3,6-di-methoxy-4-methyl-α-mangostin (**11**).

3. Molecular docking studies.

Table S1. Docking Scoring energies found for compounds **1** to **11** against each enzyme (PL, AA and AG)

ADV: AutoDock Vina, ADT: AutoDock 4.2, Glide: Maestro,

Compound	Pancreatic lipase			α-amilase			α-glucosidase		
	Score (Kcal/mol)								
	ADV	AD4	Glide	ADV	AD4	Glide	ADV	AD4	Glide
1	-9,200	-7,080	-6,278				-8,500	-5,560	-3,850
2	-8,800	-5,460	-5,782	-7,400	-4,430	-3,554	-7,800	-5,090	-4,603
3	-9,400	-4,970	-5,789				-7,800	-4,470	-4,099
4	-8,900	-4,740	-7,192	-7,500	-5,030	-3,117	-8,300	-4,280	-3,984
5	-9,700	-6,060	-5,801	-8,600	-5,930	-3,089	-8,400	-4,550	-4,160
6	-8,900	-4,520	-5,993	-8,100	-3,790	-3,197	-7,500	-4,200	-3,745
7							-7,700	-5,180	-3,756
9	-9,100	-6,860	-6,894	-7,500	-5,610	-3,476	-8,400	-5,720	-3,394
11	-7,200	-8,788	-3,034						

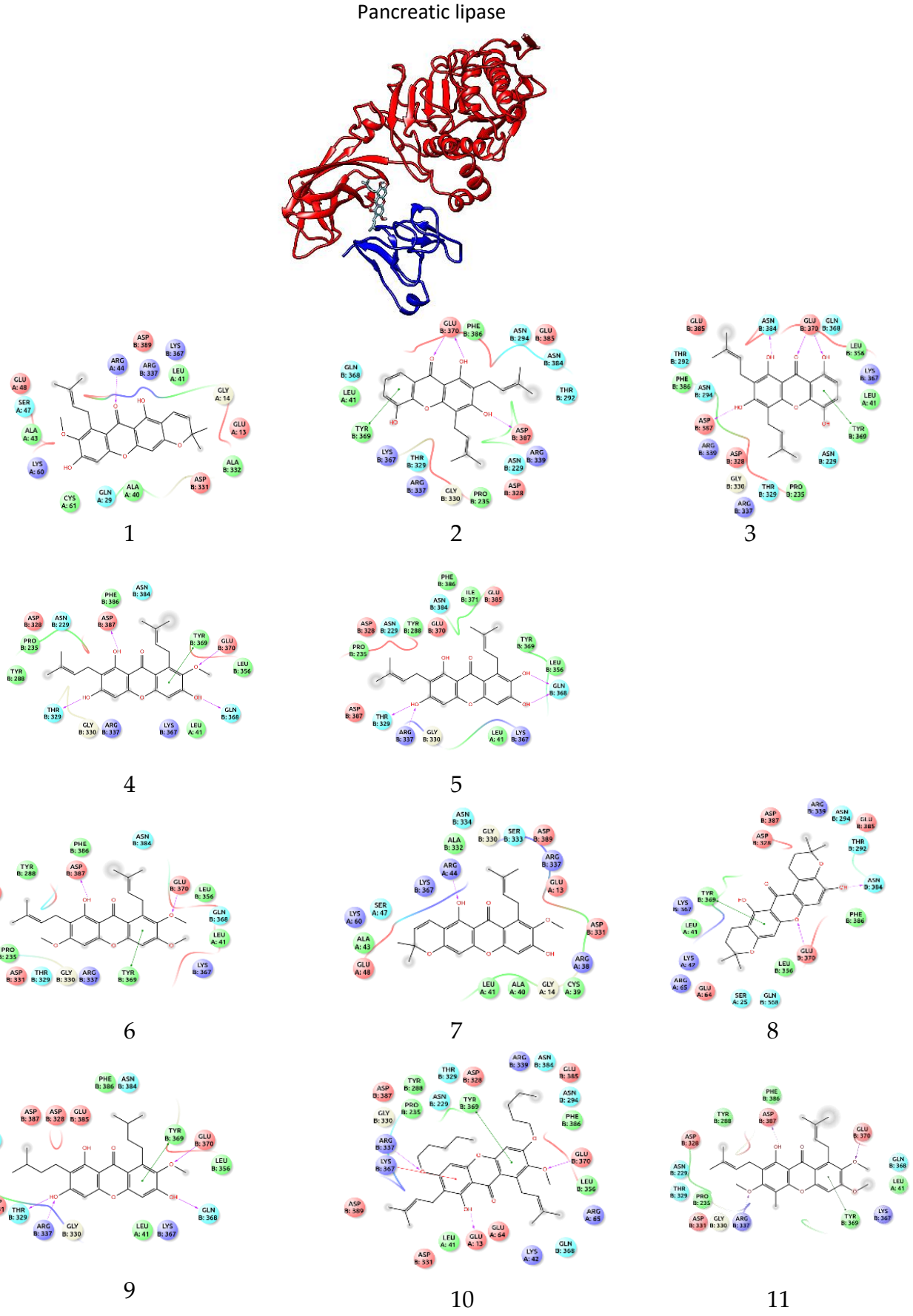


Figure S23. Molecular docking interaction found for compounds **1** to **11** against PL enzyme.

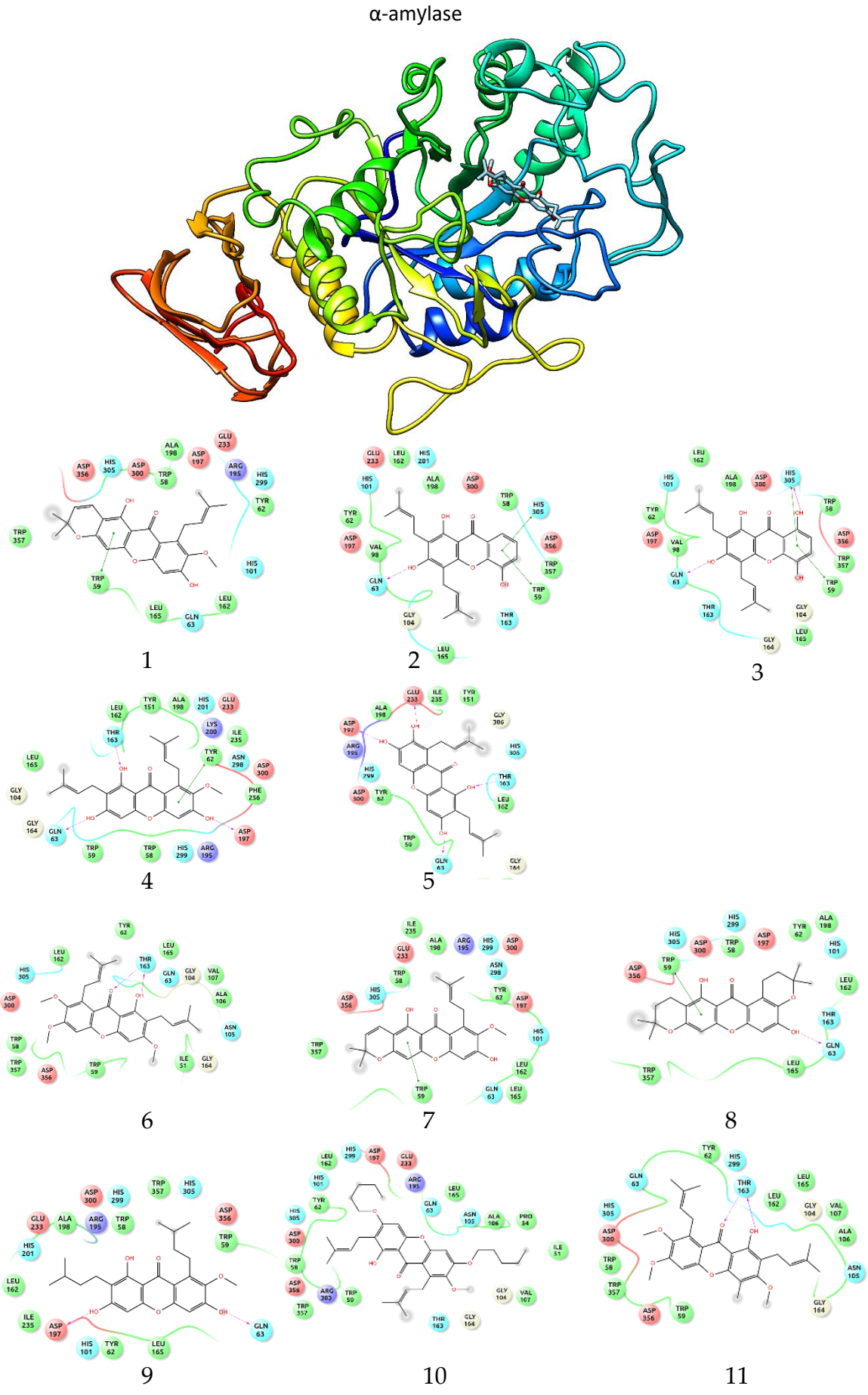
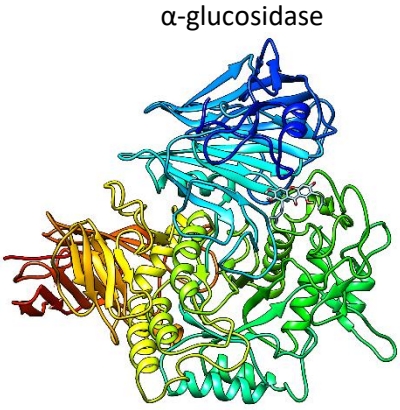
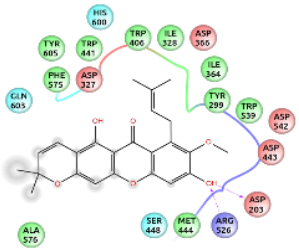


Figure S24. Molecular docking interaction found for compounds **1** to **11** against AA enzyme.

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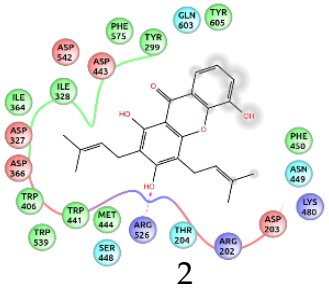
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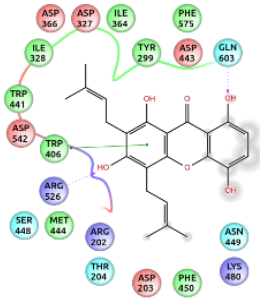
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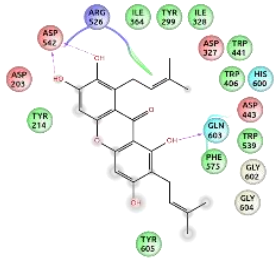
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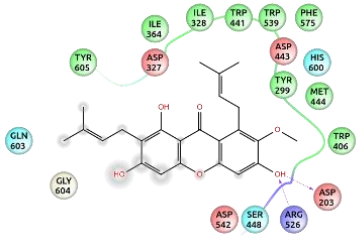
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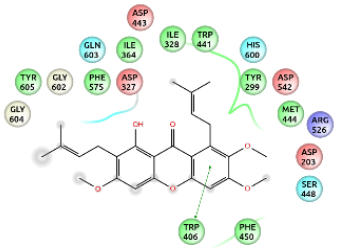
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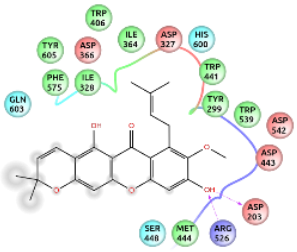
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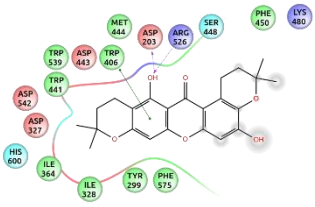
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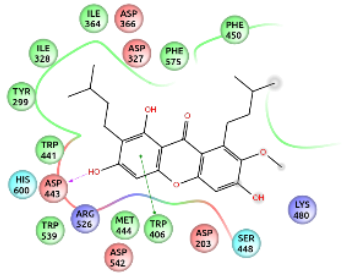
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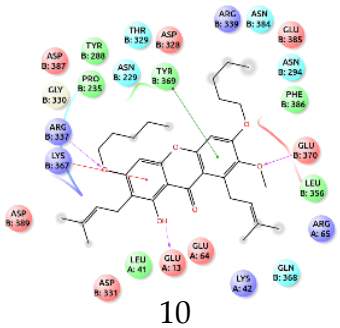
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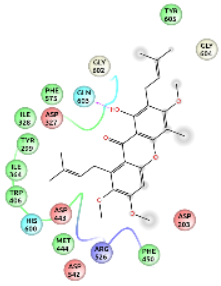
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Figure S25. Molecular docking interaction found for compounds **1** to **11** against AG enzyme.

4. Kinetic study

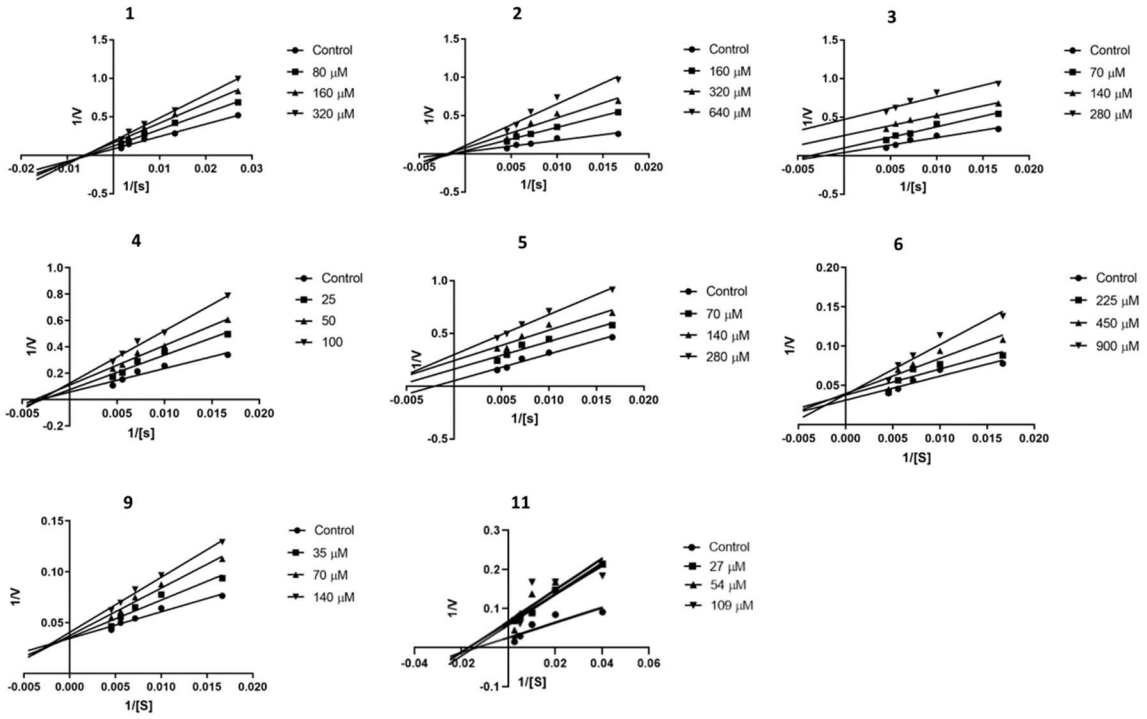

Figure S26. Kinetic found for compounds **1** to **11** against PL enzyme.

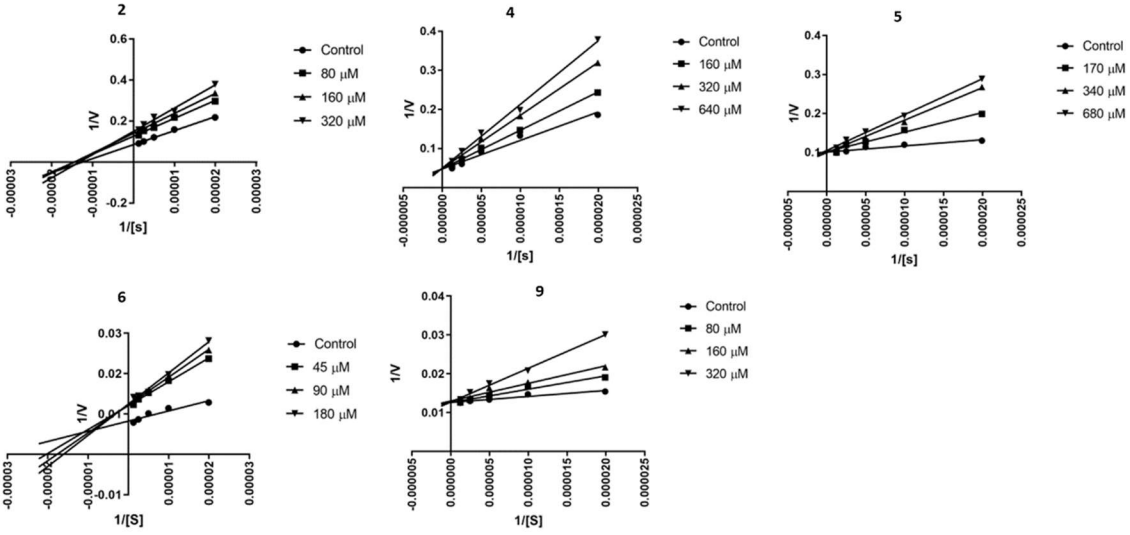

Figure S27. Kinetic found for compounds **2** to **9** against AA enzyme.

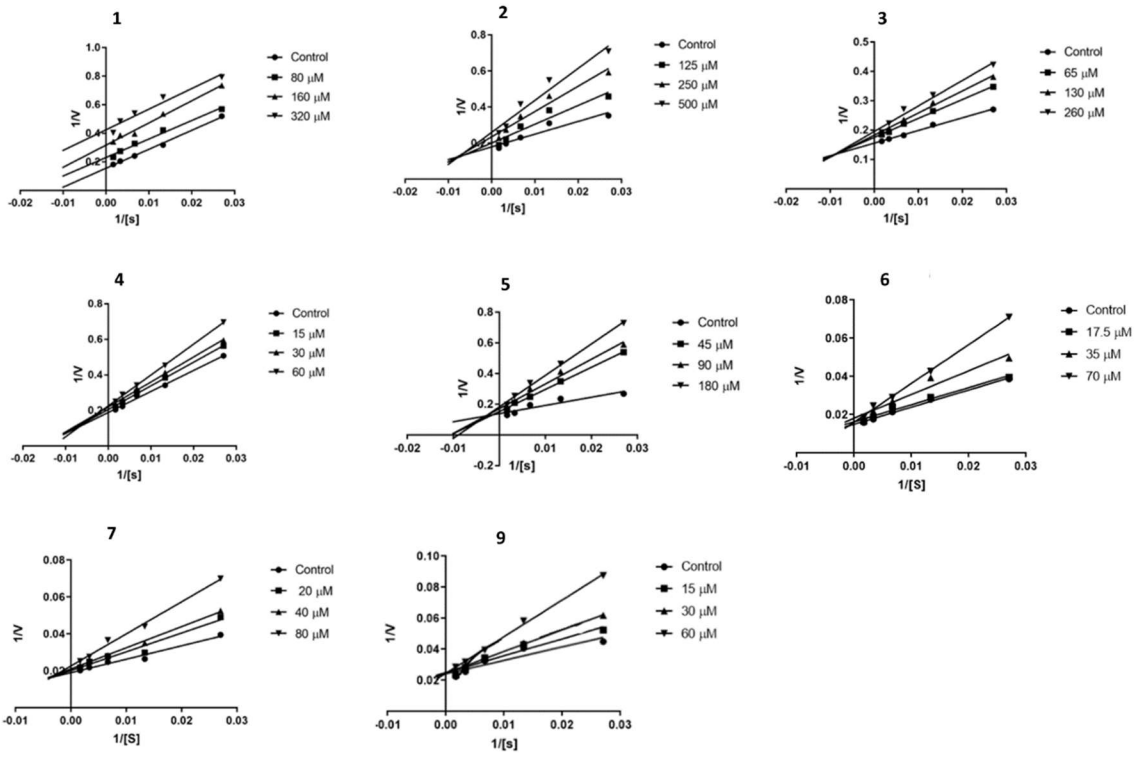

Figure S28. Kinetic found for compounds **1** to **9** against AG enzyme.